

13533

24 July 1953

From: Commanding Officer, Naval Air Station, Pensacola, Florida  
To: Chief of Naval Air Basic Training

Subj: Engines and accessories recovered from RAQ-2 aircraft, BuNo 131663;  
disassembly and inspection of

Ref: (a) BAMR CD dispatch 201531Z

Encl: (1) NASP Photo No. NA9 2158-7-53  
(2) NASP Photo No. NA9 2149-7-53  
(3) NASP Photo No. NA9 2153-7-53  
(4) NASP Photo No. NA9 2154-7-53  
(5) NASP Photo No. NA9 2156-7-53  
(6) NASP Photo No. NA9 2155-7-53  
(7) NASP Photo No. NA9 2157-7-53

1. Reference (a) requested a disassembly and inspection of W.A.C. model R-3350-30WA engines recovered from model RAQ-2 aircraft, BuNo 131663.

a. Investigation of W.A.C. model R-3350-30WA engine, serial No. W-562850, (starboard) and accessories.

- (1) Removed carburetor air box, fractured and burned from impact.
- (2) Removed carburetor, Bendix model PR58T1, serial No. 767965, parts list No. 391250-3, throttle body fractured and burned at impact. Disassembly revealed all diaphragms, seals, jets and metering valves were in good condition.
- (3) Removed generator, Westinghouse P/N A28A8584-1, type E-30, serial No. Jx3164. The generator shaft was sheared (old break) shown in enclosure (1). Visual inspection revealed exterior burns and impact damage. Disassembly inspection revealed no discrepancies and the generator was believed to be in operative condition.
- (4) Removed magneto, Scintilla model DLN9, serial No. YT001598, P/N 10-32830-1. The magneto had exterior burns, but was bench checked and determined to be in operative condition.
- (5) Removed hydraulic pump. Hydraulic pump was checked and found to be in operative condition.
- (6) Removed starter, Bendix serial No. 460-U, Bendix drawing No. 1416-118-G. Starter was checked and found to be in operative condition.
- (7) Removed water regulator adapter.
- (8) Removed tachometer generator and fuel pump drive. The tachometer, analyzer and mounting pad were found in good condition.
- (9) Removed supercharger control valve - excessive damage from impact.
- (10) Removed right and left distributors. The distributors were inspected and checked for internal timing and were found to be in good condition.
- (11) Removed impeller injection spinner discharge valve assembly - seals good and evidence of fuel.
- (12) Removed push rods, housings, adapters and tappets from front bank of cylinders. Push rods and housings were damaged from impact.

Enclosure (3) to VNR-153 AAR No. 2-53.

24 July 1953

13533

- (13) Removed power recovery turbines.
  - (a) No. 1, serial No. WA-7996, turned freely.
  - (b) No. 2, serial No. FAD-2235, turned freely.
  - (c) No. 3, serial No. WA-5791, blades sheared by collapse of the flight hood at impact. Impact pushed the turbine to the rear, shearing the forward hold down screws for the adapter and sheared the turbine drive splines.
- (14) Removed ignition harness.
- (15) Removed spark plugs.
- (16) Removed crankcase front section assembly. Forward portion fractured and was carried away with propeller.
- (17) Propeller shaft failed in the necked section forward of the transfer journal and inspection of the fracture indicated it had failed in bending at impact.
- (18) Forward reduction gearing - no discrepancies.
- (19) Front cam, vibration balancer and drive - no discrepancies.
- (20) Rotated crankshaft - turned freely.
- (21) Removed cylinders Nos. 17 and 18. Inspection of power case and crankshaft assembly revealed no discrepancies.
- (22) Removed rear oil pump and sump - no discrepancies.
- (23) Removed rear supercharger cover - no discrepancies.
- (24) Inspected impeller and impeller drive - no discrepancies.
- (25) Removed supercharger rear housing - no discrepancies.
- (26) Removed supercharger front housing - no discrepancies.
- (27) Inspected rear cam, vibration balancer and drive - no discrepancies.
- (28) The radio noise filter was given a continuity check and there was no evidence of a short or ground in this component.
- (29) Hamilton Standard model 24260-245 propeller, serial No. 169808.
  - (a) Propeller and integral oil control were received attached to the propeller shaft which had broken away from the engine at the time of impact.
  - (b) Propeller and integral oil control were severely damaged by impact and/or fire.
  - (c) Three propeller blades were found at  $\neq 16^\circ$  angle, one blade was found at  $\neq 20^\circ$  angle.
  - (d) The teeth of the rotating cam were damaged and/or sheared in the position of the blade that was found at the  $\neq 20^\circ$  angle.
  - (e) The propeller dome was found set at  $\neq 16^\circ$ .
  - (f) The propeller retaining nut was found to be insufficiently torqued.
  - (g) Slight corrosion was found on various internal ferrous parts.

24 July 1953

13533

(h) The governor head was found set for maximum rpm.

(i) Examination of preloading screw thrust rings in an attempt to determine blade angle at initial impact gave negative results.

(j) Oil was found outboard of the propeller piston. Oil inboard of the piston apparently had leaked out through openings made at the time of impact.

(k) Partial disassembly of the integral oil control, serial No. A526, revealed no abnormal conditions. The high pressure relief valve was found set at 800 psi. It was impossible to determine if an attempt had been made to feather the propeller.

(l) Examination and check of mechanisms for freedom of movement revealed no discrepancies.

(m) Electrical checks of solenoid valves and the auxiliary motor revealed them to be in operating condition.

b. Investigation of W.A.C. model R-3350-30WA engine, serial No. W-562859 (port) and accessories.

(1) Removed carburetor, Bendix model PR58T1, serial No. 745406A, parts list No. 391250-3.

(a) Primer burned, Bendix serial No. 24, as shown in enclosures (2) and (3).

(b) Left hold down stud sheared as shown in enclosures (2), (3) and (4).

(c) Right hold down stud bent as shown in enclosures (3) and (4).

(d) All threads stripped from right hold down stud nut as shown in enclosure (5).

(e) Primer mounting pad on pressure regulator cover mutilated as shown in enclosure (4).

(f) Mounting flange of primer showed no mutilation as evidenced by enclosure (6).

(g) The carburetor was disassembled and all diaphragms, seals, jets and metering valves were found in operative condition.

(2) Removed starter, Bendix serial No. 476-U, Bendix drawing No. 1416-118-G. Starter was checked and found to be in operative condition.

(3) Removed generator, Westinghouse P/N A28A8584-1, type E-30, serial No. Jx3166. The generator shaft was sheared as shown in enclosure (7). Visual inspection revealed exterior burns and impact damage. Disassembly inspection revealed no discrepancies and the generator was believed to be in operative condition.

(4) Removed hydraulic pump. Hydraulic pump was checked and found to be in operative condition.

(5) Removed magneto, Scintilla model DL9N, serial No. YT-001583, P/N 10-32830-1. The magneto had exterior burns, but was bench checked and determined to be in operative condition.

(6) Removed adapter for water regulator.

(7) Removed tachometer generator and fuel pump drive. The tachometer, analyzer and mounting pad were found in good condition.

24 July 1953

13533

- (8) Removed power recovery turbines.
  - (a) No. 1, serial No. WA-1316, turned freely.
  - (b) No. 2, serial No. FAD-2190, blades damaged by collapse of the shield assembly at impact.
  - (c) No. 3, serial No. WA-728, turned freely.
- (9) Removed supercharger control valve - excessively damaged from impact.
- (10) Right and left distributors were carried away at impact. The distributors were recovered and found to be excessively damaged from impact. The distributors were disassembled and it is believed that they were in operative condition prior to impact.
- (11) Removed front oil sump and pump.
- (12) Removed governor and torquemeter booster pump drive.
- (13) Removed right and left distributor drives.
- (14) Removed impeller injection spinner discharge valve assembly - seals good and evidence of fuel.
- (15) Crankcase front section sheared in area of magneto distributor drives and the forward portion was carried away with the propeller.
- (16) Forward portion of front crankcase section was recovered with the propeller. Investigation revealed four reduction gear pinion bolts and three reduction pinion bolt locks were damaged by the reduction drive gear at impact.
- (17) Removed ignition coils, ignition harness and spark plugs. The terminal spring and nut were not installed in the spark plug lead for the rear plug on No. 13 cylinder. However, inspection of the spark plug revealed that it had been firing.
- (18) Front cam, vibration balancer and drive - no discrepancies.
- (19) Crankshaft was rotated and turned freely.
- (20) Removed cylinders Nos. 16 and 17. Inspection revealed the crankshaft rear main bearing inner race flange was fractured. It is believed that this discrepancy resulted from impact which caused the rearward movement of the crankshaft assembly. Excessive mutilation of the crankshaft and front extension confirmed the rearward movement of the crankshaft assembly.
- (21) Removed rear oil sump and pump - no discrepancies.
- (22) Removed rear supercharger cover - no discrepancies.
- (23) Inspected impeller and impeller drive - no discrepancies.
- (24) Removed supercharger rear housing - no discrepancies.
- (25) Removed supercharger front housing - no discrepancies.
- (26) Inspected rear cam, vibration balancer and drive - no discrepancies.
- (27) Hamilton Standard model 24260-245 propeller, serial No. 169801
  - (a) Propeller and integral oil control were received attached to the propeller shaft which had broken away from the engine at the time of impact.
  - (b) Propeller and integral oil control were severely damaged by impact and/or fire.



24 July 1953

13533

(c) Two propeller blades were found at  $\neq 13^\circ$  angle, one blade at  $\neq 3^\circ$  angle, and one blade at a negative angle which could not be determined.

(d) The rotating cam teeth were damaged or sheared in all four blade positions.

(e) The propeller dome was found set at  $\neq 13^\circ$ .

(f) The propeller retaining nut was found to be insufficiently torqued.

(g) Slight corrosion was found on various internal ferrous parts.

(h) The governor head was found set for maximum rpm.

(i) Examination of preloading screw thrust rings in an attempt to determine blade angle at initial impact gave negative results.

(j) Oil was found outboard of the propeller piston. Oil inboard of the piston apparently had leaked out through openings made at the time of impact.

(k) Partial disassembly of the integral oil control, serial No. 1314, revealed no abnormal conditions. The high pressure relief valve was found set at 1000 psi. It was impossible to determine if an attempt had been made to feather the propeller.

(l) Examination and check of mechanisms for freedom of movement revealed no discrepancies.

(m) Electrical checks of solenoid valves and the auxiliary motor revealed them to be in operating condition.

2. Investigation of the engines revealed no evidence of oil starvation or internal failure. This may be substantiated by the fact that the engines were rotated freely after removal of the spark plugs. It is believed that the engines were functioning normally and that all damage was incurred from initial to final impact.

3. Investigation of the propellers revealed no material or functional discrepancies which could contribute to engine failure.

4. The method of failure of the primer hold down stud on the port carburetor has not been determined. Further investigations are being conducted to determine the sequence of failure and whether the failure occurred prior to or after initial impact.

16420  
J. E. HOGE

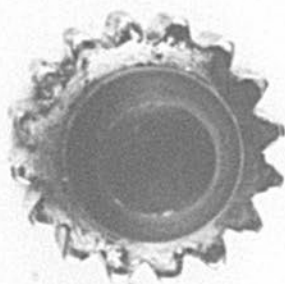
By direction

Copy to:

BAMR CD Pensacola (with encls)  
CNATRA (with encls)  
BUAER (with encls)  
CNO (with encls)  
CG SECOND MAW, Cherry Point (with encls)  
MAWAIRTRGRU 35, Cherry Point (with encls)  
Aviation Safety Activity, Norfolk (with encls)  
NAAS Whiting Field (with encls)

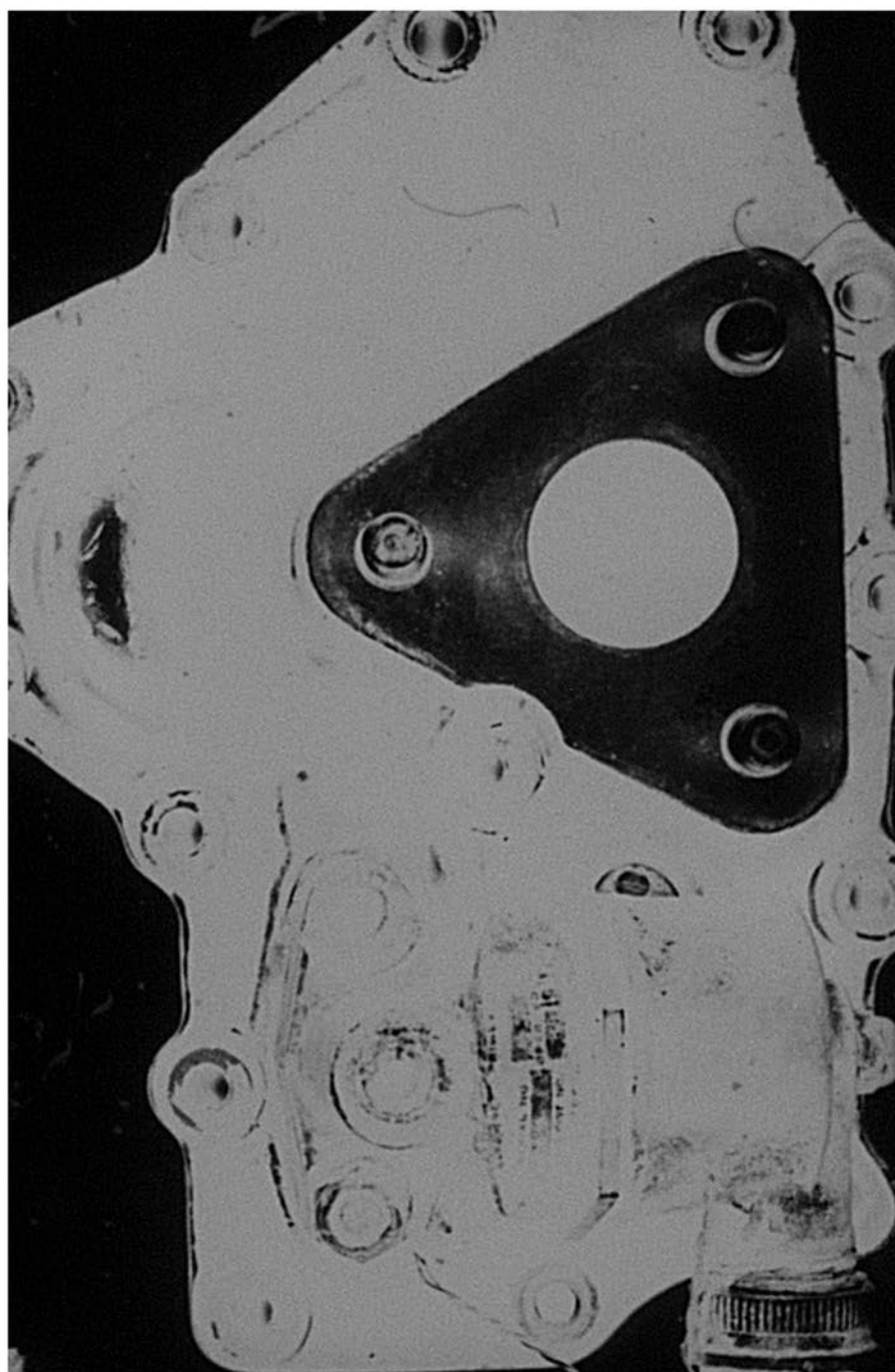
CERTIFIED TO BE A TRUE COPY

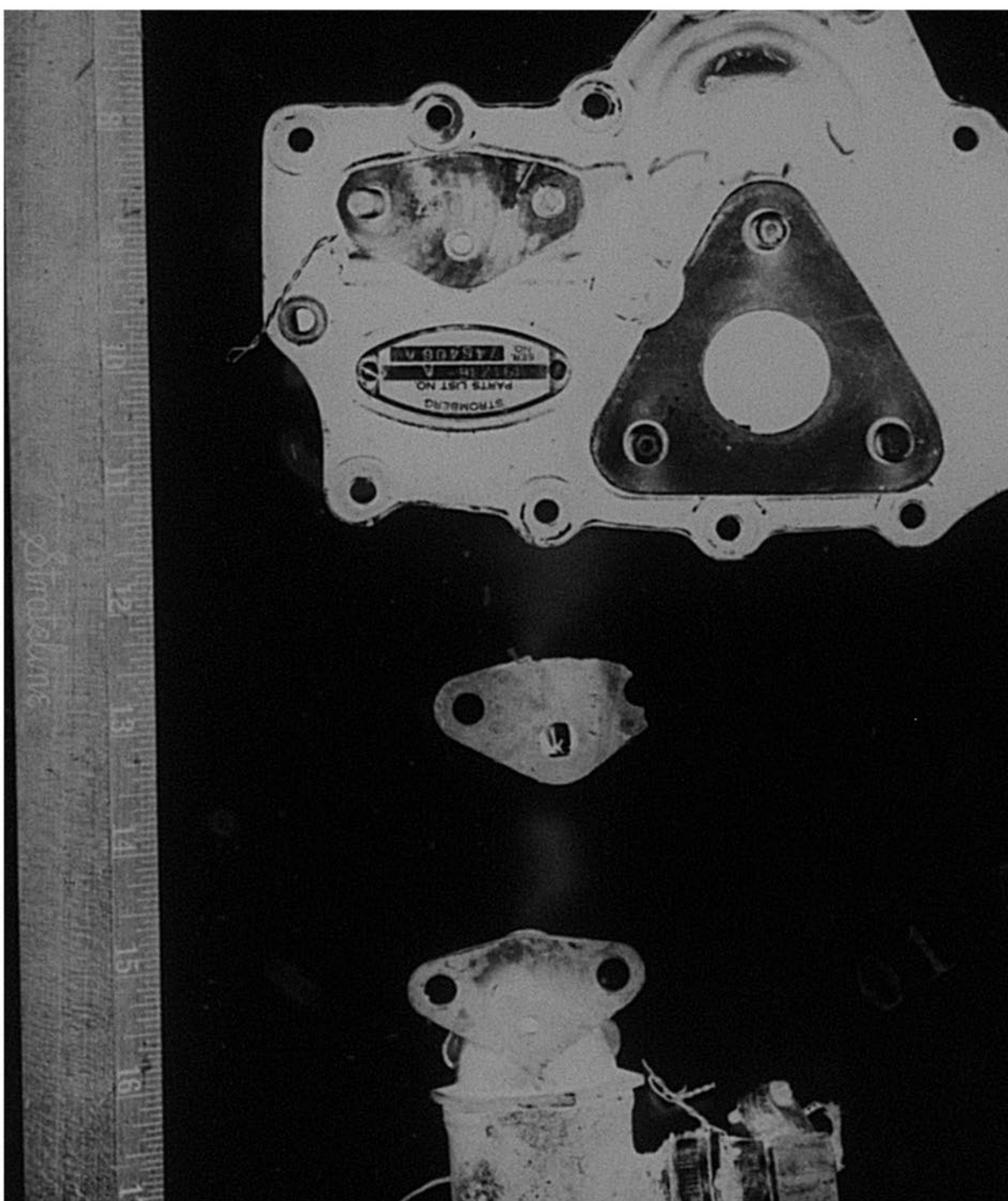
*Edw. A. B. [Signature]*  
Eng. Officer



016421

Strateline

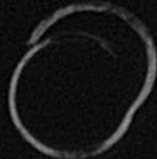
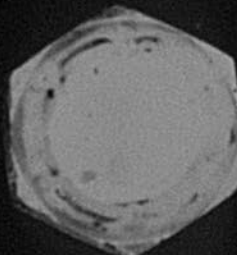








ENCLOSURE (5)



01-42

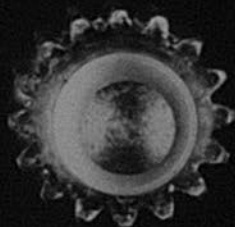


ENL (3)



ENCL (1)

Strateline



01-422



NA9/F11-1  
NOR:AE:LWC:jlh

13533

U. S. NAVAL AIR STATION  
PENSACOLA, FLORIDA

24 July 1953

From: Commanding Officer, Naval Air Station, Pensacola, Florida  
To: Chief of Naval Air Basic Training  
Subj: Engines and accessories recovered from R4Q-2 aircraft, BuNo 131663;  
disassembly and inspection of  
Ref: (a) BAMR CD dispatch 201531Z

Encl: (1) NASP Photo No. NA9 2158-7-53  
(2) NASP Photo No. NA9 2149-7-53  
(3) NASP Photo No. NA9 2153-7-53  
(4) NASP Photo No. NA9 2154-7-53  
(5) NASP Photo No. NA9 2156-7-53  
(6) NASP Photo No. NA9 2155-7-53  
(7) NASP Photo No. NA9 2157-7-53

1. Reference (a) requested a disassembly and inspection of W.A.C. model R-3350-30WA engines recovered from model R4Q-2 aircraft, BuNo 131663.

a. Investigation of W.A.C. model R-3350-30WA engine, serial No. W-562850, (starboard) and accessories.

(1) Removed carburetor air box, fractured and burned from impact.

(2) Removed carburetor, Bendix model PR58T1, serial No. 767965, parts list No. 391250-3, throttle body fractured and burned at impact. Disassembly revealed all diaphragms, seals, jets and metering valves were in good condition.

(3) Removed generator, Westinghouse P/N A28A8584-1, type E-30, serial No. Jx3164. The generator shaft was sheared (old break) shown in enclosure (1). Visual inspection revealed exterior burns and impact damage. Disassembly inspection revealed no discrepancies and the generator was believed to be in operative condition.

(4) Removed magneto, Scintilla model DIN9, serial No. YT001598, P/N 10-32830-1. The magneto had exterior burns, but was bench checked and determined to be in operative condition.

(5) Removed hydraulic pump. Hydraulic pump was checked and found to be in operative condition.

(6) Removed starter, Bendix serial No. 460-U, Bendix drawing No. 1416-118-G. Starter was checked and found to be in operative condition.

013454

- (7) Removed water regulator adapter.
- (8) Removed tachometer generator and fuel pump drive. The tachometer, analyzer and mounting pad were found in good condition.
- (9) Removed supercharger control valve - excessive damage from impact.
- (10) Removed right and left distributors. The distributors were inspected and checked for internal timing and were found to be in good condition.
- (11) Removed impeller injection spinner discharge valve assembly - seals good and evidence of fuel.
- (12) Removed push rods, housings, adapters and tappets from front bank of cylinders. Push rods and housings were damaged from impact.
- (13) Removed power recovery turbines.
  - (a) No. 1, serial No. WA-7996, turned freely.
  - (b) No. 2, serial No. FAD-2235, turned freely.
  - (c) No. 3, serial No. WA-5791, blades sheared by collapse of the flight hood at impact. Impact pushed the turbine to the rear, shearing the forward hold down screws for the adapter and sheared the turbine drive splines.
- (14) Removed ignition harness.
- (15) Removed spark plugs.
- (16) Removed crankcase front section assembly. Forward portion fractured and was carried away with propeller.
- (17) Propeller shaft failed in the necked section forward of the transfer journal and inspection of the fracture indicated it had failed in bending at impact.
- (18) Forward reduction gearing - no discrepancies.
- (19) Front cam, vibration balancer and drive - no discrepancies.
- (20) Rotated crankshaft - turned freely.
- (21) Removed cylinders Nos. 17 and 18. Inspection of power case and crankshaft assembly revealed no discrepancies.
- (22) Removed rear oil pump and sump - no discrepancies.
- (23) Removed rear supercharger cover - no discrepancies.

- (24) Inspected impeller and impeller drive - no discrepancies.
- (25) Removed supercharger rear housing - no discrepancies.
- (26) Removed supercharger front housing - no discrepancies.
- (27) Inspected rear cam, vibration balancer and drive - no discrepancies.
- (28) The radio noise filter was given a continuity check and there was no evidence of a short or ground in this component.
- (29) Hamilton Standard model 24260-245 propeller, serial No. 169808.
  - (a) Propeller and integral oil control were received attached to the propeller shaft which had broken away from the engine at the time of impact.
  - (b) Propeller and integral oil control were severely damaged by impact and/or fire.
  - (c) Three propeller blades were found at  $\neq 16^\circ$  angle, one blade was found at  $\neq 20^\circ$  angle.
  - (d) The teeth of the rotating cam were damaged and/or sheared in the position of the blade that was found at the  $\neq 20^\circ$  angle.
  - (e) The propeller dome was found set at  $\neq 16^\circ$ .
  - (f) The propeller retaining nut was found to be insufficiently torqued.
  - (g) Slight corrosion was found on various internal ferrous parts.
  - (h) The governor head was found set for maximum rpm.
  - (i) Examination of preloading screw thrust rings in an attempt to determine blade angle at initial impact gave negative results.
  - (j) Oil was found outboard of the propeller piston. Oil inboard of the piston apparently had leaked out through openings made at the time of impact.
  - (k) Partial disassembly of the integral oil control, serial No. A526, revealed no abnormal conditions. The high pressure relief valve was found set at 800 psi. It was impossible to determine if an attempt had been made to feather the propeller.
  - (l) Examination and check of mechanisms for freedom of movement revealed no discrepancies.
  - (m) Electrical checks of solenoid valves and the auxiliary motor revealed them to be in operating condition.

NA9/ F11-1  
NOR:AE:LWC:jlh  
13533

24 July 1953

b. Investigation of W.A.C. model R-3350-30WA engine, serial No. W-562859 (port) and accessories.

(1) Removed carburetor, Bendix model PR58T1, serial No. 745406A, parts list No. 391250-3.

(a) Primer burned, Bendix serial No. 24, as shown in enclosures (2) and (3).

(b) Left hold down stud sheared as shown in enclosures (2), (3) and (4).

(c) Right hold down stud bent as shown in enclosures (3) and (4).

(d) All threads stripped from right hold down stud nut as shown in enclosure (5).

(e) Primer mounting pad on pressure regulator cover mutilated as shown in enclosure (4).

(f) Mounting flange of primer showed no mutilation as evidenced by enclosure (6).

(g) The carburetor was disassembled and all diaphragms, seals, jets and metering valves were found in operative condition.

(2) Removed starter, Bendix serial No. 476-U, Bendix drawing No. 1416-118-G. Starter was checked and found to be in operative condition.

(3) Removed generator, Westinghouse P/N A28A8584-1, type E-30, serial No. Jx3166. The generator shaft was sheared as shown in enclosure (7). Visual inspection revealed exterior burns and impact damage. Disassembly inspection revealed no discrepancies and the generator was believed to be in operative condition.

(4) Removed hydraulic pump. Hydraulic pump was checked and found to be in operative condition.

(5) Removed magneto, Scintilla model DL9N, serial No. YT-001583, P/N 10-32830-1. The magneto had exterior burns, but was bench checked and determined to be in operative condition.

(6) Removed adapter for water regulator.

(7) Removed tachometer generator and fuel pump drive. The tachometer, analyzer and mounting pad were found in good condition.



NA9/F11-1  
NOR:AE:LWC:jlh

24 July 1953

13533

- (8) Removed power recovery turbines.
  - (a) No. 1, serial No. WA-1316, turned freely.
  - (b) No. 2, serial No. FAD-2190, blades damaged by collapse of the shield assembly at impact.
  - (c) No. 3, serial No. WA-728, turned freely.
- (9) Removed supercharger control valve - excessively damaged from impact.
- (10) Right and left distributors were carried away at impact. The distributors were recovered and found to be excessively damaged from impact. The distributors were disassembled and it is believed that they were in operative condition prior to impact.
- (11) Removed front oil sump and pump.
- (12) Removed governor and torquemeter booster pump drive.
- (13) Removed right and left distributor drives.
- (14) Removed impeller injection spinner discharge valve assembly - seals good and evidence of fuel.
- (15) Crankcase front section sheared in area of magneto distributor drives and the forward portion was carried away with the propeller.
- (16) Forward portion of front crankcase section was recovered with the propeller. Investigation revealed four reduction gear pinion bolts and three reduction pinion bolt locks were damaged by the reduction drive gear at impact.
- (17) Removed ignition coils, ignition harness and spark plugs. The terminal spring and nut were not installed in the spark plug lead for the rear plug on No. 13 cylinder. However, inspection of the spark plug revealed that it had been firing.
- (18) Front cam, vibration balancer and drive - no discrepancies.
- (19) Crankshaft was rotated and turned freely.
- (20) Removed cylinders Nos. 16 and 17. Inspection revealed the crankshaft rear main bearing inner race flange was fractured. It is believed that this discrepancy resulted from impact which caused the rearward movement of the crankshaft assembly. Excessive mutilation of the crankshaft and front extension confirmed the rearward movement of the crankshaft assembly.
- (21) Removed rear oil sump and pump - no discrepancies.

24 July 1953

- (22) Removed rear supercharger cover - no discrepancies.
- (23) Inspected impeller and impeller drive - no discrepancies.
- (24) Removed supercharger rear housing - no discrepancies.
- (25) Removed supercharger front housing - no discrepancies.
- (26) Inspected rear cam, vibration balancer and drive - no discrepancies.
- (27) Hamilton Standard model 24260-245 propeller, serial No. 169801

(a) Propeller and integral oil control were received attached to the propeller shaft which had broken away from the engine at the time of impact.

(b) Propeller and integral oil control were severely damaged by impact and/or fire.

(c) Two propeller blades were found at  $\pm 13^\circ$  angle, one blade at  $\pm 3^\circ$  angle, and one blade at a negative angle which could not be determined.

(d) The rotating cam teeth were damaged or sheared in all four blade positions.

(e) The propeller dome was found set at  $\pm 13^\circ$ .

(f) The propeller retaining nut was found to be insufficiently torqued.

(g) Slight corrosion was found on various internal ferrous parts.

(h) The governor head was found set for maximum rpm.

(i) Examination of preloading screw thrust rings in an attempt to determine blade angle at initial impact gave negative results.

(j) Oil was found outboard of the propeller piston. Oil inboard of the piston apparently had leaked out through openings made at the time of impact.

(k) Partial disassembly of the integral oil control, serial No. 1314, revealed no abnormal conditions. The high pressure relief valve was found set at 1000 psi. It was impossible to determine if an attempt had been made to feather the propeller.

(l) Examination and check of mechanisms for freedom of movement revealed no discrepancies.

(m) Electrical checks of solenoid valves and the auxiliary motor revealed them to be in operating condition.

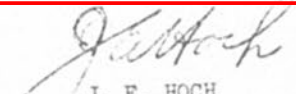
NA9/F11-1  
NOR:AE:LWC:jlh  
13533

24 July 1953

2. Investigation of the engines revealed no evidence of oil starvation or internal failure. This may be substantiated by the fact that the engines were rotated freely after removal of the spark plugs. It is believed that the engines were functioning normally and that all damage was incurred from initial to final impact.

3. Investigation of the propellers revealed no material or functional discrepancies which could contribute to engine failure.

4. The method of failure of the primer hold down stud on the port carburetor has not been determined. Further investigations are being conducted to determine the sequence of failure and whether the failure occurred prior to or after initial impact.

  
J. E. HOCH  
By direction

Copy to:  
BAMR CD Pensacola (with encls)  
CNATRA (with encls)  
BUAER (with encls)  
CNO (with encls)  
CG SECOND MAW, Cherry Point (with encls)  
MAWAIRTRGRU 35, Cherry Point (with encls)  
Aviation Safety Activity, Norfolk (with encls)  
NAAS Whiting Field (with encls)

016460